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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,698	01/28/2004	Dan G. Wallin	5681-62001	2084

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EXAMINER

BRADLEY, MATTHEW A

ART UNIT	PAPER NUMBER
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2187

DATE MAILED: 10/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/766,698

Applicant(s)

WALLIN ET AL.

Examiner

Matthew Bradley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☒ Claim(s) 19 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 313016

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

This Office Action has been issued in response to amendment filed 10 July 2006. Applicant's arguments have been carefully and fully considered but are moot in view of the new ground(s) of rejection as necessitated by amendment. Accordingly, this action has been made FINAL.

Claim Status

Original claims 1-18 and new claims 19-20 remain pending and are ready for examination.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **1-4** and **10-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over van de Waerd (U.S. 2004/0039878), hereinafter referred to as van de Waerd, and in view of Koyanagi et al (U.S. 6,606,688), hereinafter referred to as Koyanagi.

As per independent claims **1** and **10**, van de Waerd teach,

- a first cache receiving a request to access a first line of data; (Paragraph 0007 – *specifically taught as data bytes being transferred from the memory subsystem to the cache memory. In order for this to occur, a request to access the data is issued.*)

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- determining that a cache miss with respect to the first line occurred; and
(Paragraph 0007)

van de Waerdt does not explicitly teach, transmitting a bundled transaction for prefetching.

Koyanagi teaches,

- transmitting a bundled transaction on a system interconnect in response to the cache miss, wherein the bundled transaction combines a request for the line of data and a prefetch request, and (Column 2 lines 31-36 and Column 2 lines 49-57).
- wherein the bundled transaction includes a bit-map indicating selected lines of data beyond the first line to be prefetched in response to the prefetch request (Column 2 lines 53-57). *The Examiner notes that referring back to applicant's specification, paragraph 0034, applicant's define 'bit-map' to simply and broadly be something used to indicate which lines beyond the original request to prefetch. As taught in Koyanagi, the stride included with the prefetch request indicates which lines beyond the original request to prefetch. Accordingly, Koyanagi's prefetch and stride anticipate applicant's bundled transaction including a bit-map.*

As per independent claim 10, the Examiner notes that van de Waerdt teaches a multiprocessing computer system as shown in Figure 1c and taught further in paragraph 0032 that performs the method of claim 1.

van de Waerdt and Koyanagi are analogous art because they are from the same field of endeavor namely, prefetch of data.

At the time of invention, it would have been obvious to one of ordinary skill in the art, having both the teachings of van de Waerdt and Koyanagi before him/her to combine the additional caching of lines via a stride width of Koyanagi with van de Waerdt for the benefit of caching additional data such that cache memory is used effectively.

The suggestion for doing so would have been that, a cache controller generates at least one prefetch request with a variable stride width or with an address that is higher or lower than the requested address. This allows for more data to be written to the cache memory, thus allowing more effective use of the cache memory (Column 2 lines 53-57).

Therefore, it would have been obvious to combine van de Waerdt with Koyanagi for the additional caching of lines via a stride width to obtain the invention as specified in claims 1-4 and 10-13.

As per dependent claims **2** and **11**, the combination of van de Waerdt and Koyanagi teach, wherein the request corresponding to the first line of data is a read request (Paragraph 0007 as a read taught in paragraph 0042 of van de Waerdt).

As per dependent claims **3** and **12**, the combination of van de Waerdt and Koyanagi teach, wherein the prefetch request is a prefetch read request (Paragraph 0007 and Paragraph 0042 of van de Waerdt). *The Examiner notes that if the initial*

request to access data is done with a read, the prefetch request issued after the miss would be a read as well as data is still requested to be read.

As per dependent claims **4** and **13**, the combination of van de Waerdt and Koyanagi teach, wherein the prefetch read request is a request to a sequential cache line (Paragraph 0034 of van de Waerdt).

Claims **5-9** and **14-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over van de Waerdt and in view of Koyanagi and further in view of Hagersten et al (U.S. 5,881,303), hereinafter referred to as Hagersten.

As per dependent claims **5** and **14**, the combination of van de Waerdt and Koyanagi teach the limitations note supra.

The combination of van de Waerdt and Koyanagi does not explicitly teach upgrading a request.

Hagersten teach wherein the request corresponding to the first line of data is an upgrade request (Column 17 lines 32-45).

Van de Waerdt and Koyanagi, and Hagersten are analogous art because they are from the same field of endeavor namely computing systems involving prefetch.

At the time of the invention it would have been obvious to even one of rudimentary skill in the art, having both the teachings of van de Waerdt and Koyanagi, and Hagersten before him/her, to combine van de Waerdt and Koyanagi, with Hagersten for the benefit of coherency by upgrading requests to limit the number of stalls in a processing system.

The suggestion for doing so would have been that, "performance of the computer system may be increased due to the decreased stalls experienced by the processors (Column 3 lines 19-21 of Hagersten).

Therefore, it would have been obvious to combine van de Waerdt and Koyanagi, with Hagersten for the benefit of coherency by upgrading requests to obtain the invention as specified in claims 5-9 and 14-18.

As per dependent claims **6** and **15**, the combination of van de Waerdt and Koyanagi, and Hagersten teach, wherein the prefetch request is a prefetch upgrade request (Column 17 lines 32-45 of Hagersten). *The Examiner notes that upon exploiting the upgrade functionality of Hagersten into van de Waerdt, the prefetch issued after a cache miss would be a upgrade prefetch request as discussed supra with respect to claims 3 and 12.*

As per dependent claims **7** and **16**, the combination of van de Waerdt and Koyanagi, and Hagersten teach, wherein the prefetch upgrade request is a request to a sequential cache line (Paragraph 0034 of van de Waerdt).

As per dependent claims **8** and **17**, the combination of van de Waerdt and Koyanagi, and Hagersten teach, a second cache transitioning to a first owner state in response to downgrading from a modified state (Column 18 lines 30-39 of Hagersten).

As per dependent claims **9** and **18**, the combination of van de Waerdt and Koyanagi, and Hagersten teach, a second cache transitioning to a second owner state from the first owner state in response to a read request (Column 18 lines 30-39 of Hagersten).

Allowable Subject Matter

Claims **19-20** are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in correct and independent form including all of the limitations of the base claim and any intervening claims.

If the applicant should choose to rewrite the independent claims to include the limitations recited in the dependent claims, the applicant is then encouraged to amend the title of the invention such that it is descriptive of the invention as claimed, as required by sec. 606.01 of the MPEP. Furthermore, the summary of the invention and the abstract should be amended to bring them into harmony with the allowed claims as required by paragraph 2 of sec. 1302.01 of the MPEP.

As allowable subject matter has been indicated, applicant's response must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 C.F.R. § 1.111(b) and § 707.07(a) of the MPEP.

Response to Arguments

Applicant's arguments filed 10 July 2006 have been carefully and fully considered but are moot in view of the new ground(s) of rejection as necessitated by amendment.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

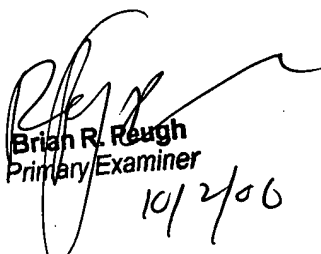
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Bradley whose telephone number is (571) 272-8575. The examiner can normally be reached on 6:30-3:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald A. Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BRP/mb


Brian R. Raugh
Primary Examiner
10/2/06